STATEMENTS

MADE ON BEHALF OF

READING AND SCHUYLKILL NAVIGATION COMPANIES

TO

JOINT COMMITTEES OF FINANCE AND ON WATER OF SELECT AND COMMON COUNCILS OF CITY OF PHILADELPHIA.

JANUARY 28, 1898.

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THE STATEMENT MADE BY JOSEPH S. HARRIS, ON BEHALF OF THE READING AND SCHUYLKILL NAVIGATION COMPANIES, TO THE JOINT COMMITTEES ON FINANCE AND ON WATER OF THE SELECT AND COMMON COUNCILS OF THE CITY OF PHILADELPHIA.

GENTLEMEN:—I very much desire that the Committees of Councils shall understand the purpose with which we have sought this interview. It is not to urge unduly that the city of Philadelphia shall buy from us the water which the Schuylkill Navigation Company controls; but as the State has given us the power to appropriate and use this water for purposes of navigation, and to sell for water power, or other purposes, the surplus water, we desire to dispose of the surplus water under our control, and have thought it our duty to come directly to the city to make this offer rather than to make it through any intermediary.

I am sure that all members of Councils agree with the public that something is very much needed to improve the water supply of Philadelphia. I know from coming in contact with personal friends who live elsewhere, that the general belief of people who live in other cities is that the Schuylkill water is absolutely unsafe to drink, and when they are in Philadelphia they do not drink it; and I think every one of us must feel humiliated when guests come to our houses to have to offer them—even for bathing purposes—such water as has been supplied during the past month. I suppose my experience is a common one, that again and again, after having drawn water for bathing, I have found it impossible to use it, and have gone without a bath, and this although I have in my house a filter which is supposed to prepare all the water required for household purposes, and which, I suppose, does improve it to some extent. I do not think the government of the city of Philadelphia proposes, permanently, to require

its citizens to put filters in their houses to make the water fit to use; nor do they propose that those persons who cannot afford to filter the water shall permanently use the filthy stuff that constitutes our water supply at present.

The chemists and other experts who have examined the Schuylkill water within the last twenty years have agreed, so far as I know, that it is free from deleterious substances held in solution, and that the only thing necessary to make it a wholesome and acceptable water is that the impurities held in suspension should be settled out of it or filtered out.

I think that all intelligent Philadelphians are agreed also that there is no source of water supply so cheap as that of the Schuylkill; both because gravity brings it directly to the city in existing conduits, and because the pumping stations and reservoirs of the city have been almost entirely adjusted to its use.

Supposing, therefore, that the city wants to use this water and to give it to the citizens of Philadelphia in proper condition, we are here this evening to show how this can be done, and to state on what terms we are willing to surrender to the city the use of the water; and we only ask a patient and intelligent hearing. After we shall have had an opportunity to state our case, the proposition will be before Councils; and it will be for the city to accept it or reject it; but we do not expect to make any other proposition.

As to our legal power over this water supply, I will ask you to consider carefully what our counsel have to present.

I am aware that many people who have not studied the subject deeply find it difficult to understand why the city should pay the Schuylkill Navigation Company for this water, which flows freely past their doors. Our counsel will endeavor to explain how the grant made to the Schuylkill Navigation Company by the State of Pennsylvania gives us the control of this water, and also that it limits us in the disposition we can make of the water, so that we have been able to find no way by which the existing reservoirs in the river can be maintained and utilized for the service of the city, except the way which we propose to present to-night.

The offer of the Reading Company, which company controls the Schuylkill Navigation Company by virtue of its ownership of a vast majority of its shares and bonds, is to furnish to the city of Philadelphia all of the water being the natural flow of the river, and to supplement this flow, in times of drought, by drawing down the existing reservoirs. These reservoirs are estimated by Mr. E. F. Smith, who has been for many years the superintendent and engineer in charge of the works of the Navigation Company, to contain 4,200,000,000 gallons of water, all of which can be drawn out so as to give, in case of drought, a supply of 70,000,000 gallons per day for sixty days, in addition to the minimum flow of the river, which flow the city engineers and our engineers agree in estimatting at 180,000,000 gallons per day, so that our proposition would result, so far as we are able to judge of the future from past experience, in giving the city a minimum supply, in times of drought, of 250,000,000 gallons daily. This amount of water is actually used by the city during the Summer season.

Our charter requires that we shall maintain the navigation of the Schuylkill River, and this we propose to do. This makes it necessary that we should maintain the dams and locks, and it makes us also responsible to the persons whose boats are passing through the Schuylkill Navigation that there shall be sufficient water for them to carry on their business. We accept that responsibility and propose to guard the city against any claims that may be made by the boatmen in case the water shall at any time become too low for them to move their boats.

It is perhaps proper to state at this point how it is that the Schuylkill Navigation Company is now able to furnish the city with the water covered by the proposition we are making. The Schuylkill Navigation, in common with all water ways of its class, has been doing for many years a constantly diminishing volume of business. This diminution is caused by the constant cheapening of transportation by rail, and by the fact that most products that are transported on the canal have to be brought to the head of navigation by rail, and after they have reached the lower end of the navigation have to be again

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taken out of the boats, placed in cars, and distributed thence by rail. This double transfer, besides causing a considerable amount of breakage, has so increased the cost of this mixed rail and water transportation that it can no longer be done as economically as the business can be moved by rail alone. Furthermore, people who depend upon getting their supplies by canal know that it will be closed by ice during three or four months of the year, so that if wholly dependent upon the canal they have to stock sufficient products to carry them over the season during which canals are closed.

The canals are also subject to breaks from high water which interrupt navigation, and as in modern practice promptness of delivery of freight is an important element, those canals which can only carry boats of small capacity have been steadily losing business. There is no reason to expect that this process will be reversed in the future, so that we feel safe in undertaking to transport all the business that may be offered to the canal without interfering with the service we now propose to render to the city. We, therefore, find that it is entirely compatible with the duties devolved upon us by the charter of the Schuylkill Navigation Company to make this undertaking to supply water to the city.

The works of the Schuylkill Navigation Company have cost about $13,000,000. We realize that no such price could be obtained for them now, and we are willing to sell one of the most valuable possessions of the Schuylkill Navigation Company, its stored water, for about one-quarter of what the works have cost us. We are under certain obligations arising out of what is known as the subway contract, which was entered into with the city in 1894, under which contract we have undertaken to repay to the city, with interest, one-half of the cost of the subway, not to exceed $3,000,000. There are also certain damages arising out of the taking property for, and out of the construction of, the Reading Terminal Railroad, on account of which judgments have been recovered against the city, and in regard to which other suits may be brought against the city.

The Reading Company, or some of its allied companies, may be obliged to assume a certain responsibility in regard

to these judgments, which judgments amount at present to about one-quarter of a million of dollars, and may in the end aggregate twice that sum.

It proposes to take in full payment for the water to be furnished to the city, as hereinbefore stated, the contract of the city to assume the Reading Company's obligations under the subway contract, and such obligations as the Reading Company has incurred or may yet incur on account of the damages to be awarded in connection with the construction of the Reading Terminal Railroad.

It is generally understood that the government of the city finds it difficult within the constitutional limitations of the borrowing power of the city to make at once all the public improvements that the true interests of the city require, and the Reading Company submits that its proposition in regard to the Schuylkill water furnishes an easy way to make the payments required for the water privileges which we propose to grant to the city, as no payments of the principal sum under the subway contract will be needed until December 31st, 1904, and as the payments thereafter to be made on account of the principal will extend through twenty years.

The city has on several occasions in the past infringed upon the rights of the Schuylkill Navigation Company by taking a large amount of water to which the Navigation Company had a prior claim, and the courts, in 1869, adjudged that the city should pay for one such infringement upon the Navigation Company's rights the sum of $300,000. Since that time, on more than one occasion, the city has requested the Schuylkill Navigation Company to draw water out of its reservoirs to supply the city's needs in time of drought, or to cleanse the river when it had become foul. This the Schuylkill Navigation Company has cheerfully done whenever it could do so, and it is believed that no such requests of the city have been ignored; but the Reading Company submits it is not consistent with the dignity of the city that it should be dependent upon the courtesy of the Schuylkill Navigation Company in this essential matter, and should have a contractual right to use the water of the Schuylkill River freely.

Should the city acquire these rights from the Schuylkill Navigation Company, it will then be in a position, through its own officers, to improve the quality of the water by filtration or sedimentation; or it will be ready to contract with other parties to construct the necessary works.

In order to prevent any misapprehension upon the subject of the freedom of the Reading Company to deal directly with the city, I will say that no person or persons have any right to come before the city and assume that they can make a contract with the city for the use of the water of the Schuylkill River. We have granted no such right, and we shall continue to deny the power of any one to make such a contract, and shall resist any attempted use of the water in derogation of our ownership therein.

As the legal *status* of this subject has never been fully presented, I have asked our counsel to accompany me for the purpose of stating what rights we have and in what manner we propose to transfer certain of them to the city; and in order that it may be made clear how easily the city, after it shall have contracted with the Reading Company, can follow up this necessary step by the equally necessary steps of preparing the water for the use of the citizens of Philadelphia, I shall present extracts from a report of Mr. E. F. Smith on this subject.

It is our purpose, in order that every one shall have an opportunity to give the study required to this important subject, to print the statements we shall submit to-night and to give them wide publicity.

I trust we shall be able to satisfy the representatives of the city that in no way can they so quickly and so cheaply supply the demand of the citizens of Philadelphia in regard to clean and pure water as by making this purchase of the water of the Schuylkill River from us.

JANUARY 28th, 1898.

Statement made by George F. Baer, Counsel of Reading Company, to the Joint Committees of Finance and on Water of Select and Common Councils of the City of Philadelphia.

George F. Baer, counsel of the Reading Company, appeared before the committee, and in behalf of that company submitted and discussed the following propositions:—

1. That the Reading Company through its ownership of capital stock and securities controls the Schuylkill Navigation Company.

This requires no discussion. It is the mere statement of a fact which will not be disputed.

2. That the Schuylkill Navigation Company has the paramount right to impound and store the waters of the Schuylkill River, and to control the flow of water from its dams.

3. That neither the city of Philadelphia nor any other corporation has now, or can acquire, any right to erect dams or storage reservoirs in the Schuylkill River, or filtration plants to be supplied with water from said river, without the consent of the Schuylkill Navigation Company.

The charter of the Navigation Company in express terms gives it power to enter upon the river Schuylkill; to open, enlarge, or deepen it; to form, make, erect, and set up any dam, locks, or any other devices whatsoever; to make a complete slack-water navigation from one end thereof to the other. Another section empowers it to use the water power from the river, sluices, or canal to propel machinery, and to sell in fee simple, lease, or rent water power to any person or persons. These privileges have been exercised, and they are continuing powers. So long as the Navigation Company exists, its rights for the purposes of its charter are paramount. No private individual, no company or municipality, can enter upon this same river to construct dams or reservoirs in it.

4. That if this right could be acquired independently of the Navigation Company, such acquisition will involve enormous damages to every riparian owner far exceeding the sum asked by the Navigation Company for the rights and privileges it offers the city.

The damages occasioned by the construction of the Navigation Company's works have been settled many years ago ; but, if the Navigation Company is abandoned, then every proprietor along the river will be entitled to damages from any one maintaining or erecting dams in the river or diverting water therefrom. It is impossible to estimate the amount of these damages; they certainly would amount to many millions of dollars. In the course of time, property along the river has become very valuable, and would be much more valuable if the river were allowed to flow unimpeded by dams.

5. That the extreme right of the city as against the Navigation Company cannot be greater than to demand that when the waters of the river are not required for navigation, the *natural flow* of the river shall not be impeded. But the city cannot compel the Navigation Company to increase the natural flow by opening its dams and reservoirs.

The right of the city is that of a lower riparian proprietor; that is, it is entitled to the natural flow of the river for domestic use, diminished by the reasonable use of the water by the upper riparian owners for what are called domestic purposes. But this right is limited to the natural flow. The city has no control over the dams and reservoirs of the Schuylkill Navition Company, and cannot compel the Navigation Company to increase this natural flow by releasing the storm water stored therein.

6. The Navigation Company's rights and franchises cannot be sold to the city so as to give the city the right to maintain the present pools, dams, and reservoirs.

The Navigation Company's control of the water of the Schuylkill is a mere incidental power, which depends for its continued existence on the life and survival of the Navigation Company itself. If by any device the city acquires the dams and reservoirs and the Navigation Company's rights are extinguished, it cannot keep or

maintain them, or erect others, without a new appropriation of the river and a resulting assessment of damages to every property owner along the river banks. The fact that the Navigation Company had maintained dams and flooded these lands to the same extent would neither bar nor mitigate the amount of damages.

We do not dispute the accuracy of the City Solicitor's conclusion, that the Navigation Company cannot sell its rights and franchises to the city and thereby confer on the city the power to use the dams, reservoirs, and canals merely for a water supply. The Navigation Company's rights in the river are dependent upon the maintenance of the slack-water navigation which it was empowered to create. Whenever navigation is abandoned, all its dams and locks will become illegal obstructions in the river.

The case of Jessup *vs.* Loucks, decided by our own Supreme Court, has finally settled all these questions. The Codorus Navigation Company had similar powers to those of the Schuylkill Navigation Company. It erected a dam and by proper conveyance sold the right to use the water power from this dam to one Loucks. Subsequently, the Codorus Navigation Company abandoned its canal and the Codorus was no longer used for navigation. In 1856 Loucks reconstructed dam No. 1. Jessup was the owner of a mill above this dam. He brought the usual suit against Loucks for throwing back-water on his mill. The case was tried in the lower court on the theory that the only question involved was whether the rebuilt dam was similar in height to the old dam; but the Supreme Court decided that with the death of the Codorus Navigation Company all rights granted to Loucks were extinguished, and that he had no right to keep or retain the dam.

7. That to enable the city to acquire the benefit of the water stored in the dams, pools, and reservoirs without further liability to property owners, the Navigation Company must be kept alive and exercise its franchises as a navigation company to such extent as may reasonably satisfy public demand and convenience.

This proposition needs no special discussion. It follows from what I have said before.

8. I now submit the outline of a plan which I believe can be put in legal shape to accomplish the purpose therein suggested:—

The only and most economical way to secure the water of the Schuylkill for city use is by a contract with the Navigation Company, wherein it will, for a proper consideration, covenant substantially as follows:—

(*a.*) To keep and maintain its dams, slack-water pools, impounding reservoirs, and basins, and so regulate the passage of boats through its canal that the water stored in the slack-water pools, impounding reservoirs, basins, and dams shall be permitted to flow to the city of Philadelphia's water works when and as directed by the officer of the city having charge of its water supply.

(*b.*) The Reading Company shall agree to indemnify and save harmless the city of Philadelphia from all actions, claims, and liability whatever arising from any interruption of navigation, when by reason of any exigency it shall become necessary for the public good to regulate the flow of the water irrespective of the injury to navigation.

(*c.*) The more effectively to insure the performance of the contract, the Navigation Company shall appoint as its assistant superintendent such person as may be from time to time named by the Mayor of Philadelphia.

(*d.*) The Reading Company and the Navigation Company shall agree that the city of Philadelphia shall exercise all such police powers over the works of the Navigation Company as shall be necessary to prevent the pollution of the waters.

(*e.*) To permit such channels and conduits to be connected with the pools and reservoirs in the river Schuylkill as may be found convenient to convey water gathered in times of storm to new reservoirs, or to filtration beds or plants.

The Navigation Company itself could not agree to indemnify the city against an act which might on a technical construction be construed a violation of its charter. It must not consent to any such thing. But the Reading Company will assume all responsibility under the conditions named in the proposition.

The public duty devolving on the Navigation Company is not that of running boats on the canal, but making and keeping a water highway "so as to admit a safe and easy passage for loaded boats, arks, and other vessels up as well as down said river," for which it is to be paid toll, at a rate fixed in the charter. The use made by the public of the canal is no factor in its life. If the Navigation Company keeps it in condition to be used, even if by reason of change in methods of transportation described by President Harris, only one boat a year or none at all passed through the locks, the charter rights would be preserved. You see, therefore, it is entirely feasible to perform the public duty and to give the city a large use of our stored water. We can regulate the passage of boats so as to give Philadelphia abundant water.

Clause (*e*) is intended to meet the suggestion that it may be considered expedient to construct a large lake in some valley like the Perkiomen and partially supply it during periods of heavy rain and storm from the surplus water of the Schuylkill. This would be entirely feasible.

In general, I know that the citizens of Philadelphia believe that they already possess all the powers over the Schuylkill water that can be given them, but this is a great error. Under contracts between the city and the Navigation Company the city has the right to pump from our lower pools, but the Navigation Company has never agreed to supply these lower pools in times of drought with the water it has stored in its upper pools. Mr. E. F. Smith's report gives you the details of this storage, and shows you that the combined capacity of our pools, dams, and reservoirs would in times of drought, added to the minimum flow of the river, afford a supply for sixty days. It is in times of drought that the water is needed. In seasons of storm and rain, the flow of water is more than sufficient for your wants. The quality of the water involves the problem of filtration. But filtration is more necessary in times of drought than at any other time, and, if you erect filtration plants, you will require the stored water of the Navigation Company in order to give you a sufficient supply. These are practical problems that you understand better

than I. What you must not lose sight of, is the fact that these millions of gallons of water which are held in the dams and pools of the Navigation Company are not now under the control of the city, and, if you want an increased supply, you must deal in some way with the Schuylkill Navigation Company in order to obtain it. I again repeat, that under existing conditions you cannot compel us to open these dams and resrvoeirs to meet your requirements.

It is a mere waste of time to consider the different propositions, schemes, and plans presented to the city by companies or promoters proposing to solve your water problem by giving to the city an enlarged use of the water of the Schuylkill River without dealing with the undoubted control and vested rights of the Navigation Company over the subject.

I want to state in a positive way that neither the Reading Company nor the Navigation Company have any interest in these schemes. No arrangement whatever exists. They have made no agreements or promises to transfer or to sell any of their privileges in the river Schuylkill.

As large taxpayers of the city of Philadelphia, the interest of our corporations is the common interest of all the taxpayers. We desire honest and economical administration of municipal affairs. We will not, under any circumstances, be involved in any extravagant plan by means of which your water problem is to be solved at an extraordinary and unnecessary cost. We propose to deal directly with the city. It is our duty as it will be our privilege to deal justly and fairly. Whatever rights we have which will be of benefit to the city, we are willing to adjust on fair terms. If the time is here, or if it shall ever come, when in the judgment of City Councils it is desirable and expedient to acquire a larger control of the waters of the Schuylkill River than the city now has, that control can best be obtained by direct dealing between the city and our company. We prefer that it shall not be reached through hook or crook or cunning device of intermediate companies or promoters.

I respectfully submit an amended ordinance embodying the proposals I have outlined.

AN ORDINANCE

To provide for the permanent improvement of the water supply of the city of Philadelphia, by the acquisition of certain rights and privileges, to enable the city to make adequate provision for the establishment of filtration plants and the extension of its pumping, storage, and distributing system.

WHEREAS, "The president, managers, and company of The Schuylkill Navigation Company" was by its charter and the various supplements thereto vested with the right and power, among other things, to enter upon the river Schuylkill, to open, enlarge, and deepen the same; to form, make, erect, and set up any dams, locks, or any other device whatsoever to make and complete slack-water navigation and to conduct transportation thereon; with power to sell in fee simple, lease, or rent, for one or more years, the water powers from the said river to any person or persons, to be used in such manner on such terms as they may think proper; and pursuant to its said powers the said Navigation Company constructed a line of works extending from Port Carbon, in Schuylkill County, to Fairmount, in Philadelphia, comprising 60.25 miles of canals and 47.98 miles of slack-water pools or impounding basins, which said works were thereafter enlarged and deepened so as to permit the passage of vessels of one hundred and seventy-five tons burthen, at a cost of many millions of dollars;

AND WHEREAS, Afterwards the said Navigation Company leased its works, franchises, and property for the term of nine hundred and ninety-nine years to The Philadelphia and Reading Railroad Company at a guaranteed rental aggregating upwards of $650,000 annually, which said railroad company thereafter acquired the ownership of upwards of $12,200,000 of the capital of said Navigation Company (being substantially the whole thereof), represented by its various issues of stocks and bonds;

And Whereas, By virtue of various proceedings at law and in equity the said The Philadelphia and Reading Railroad Company has been divested of its possession of the works, franchises, and property of the said Navigation Company under the said lease, and said Navigation Company has resumed the possession and control of the said works, the ownership of the said stocks and bonds having become vested in the Reading Company by virtue of a sale thereof made September 23d, 1896, under the decree of the Circuit Court of the United States for the Eastern District of Pennsylvania;

And Whereas, The said Reading Company is also the owner of substantially the entire capital stock of the Philadelphia and Reading Railway Company, successor to The Philadelphia and Reading Railroad Company, which rests under certain obligations to the city under the contract for the construction of the so-called Pennsylvania Avenue Subway, and is also the owner of substantially the entire capital stock of the Philadelphia and Reading Terminal Railroad Company, which with the said The Philadelphia and Reading Railroad Company is under certain obligations to the city under the Terminal ordinance of December 26th, 1890;

And Whereas, The said Navigation Company, as owner of the said works and franchises, and the said Reading Company as owner of the stock and indebtedness of said Navigation Company, might be willing, on fair and reasonable terms, to transfer, relinquish, and surrender to the city of Philadelphia such use of the said works as shall be necessary to furnish at all times an ample supply of water for the uses of the city and the inhabitants thereof; therefore

Section 1. *The Select and Common Councils of the city of Philadelphia do ordain:* That the Mayor be, and he is hereby, authorized and instructed, in the name of the city of Philadelphia, to negotiate for a contract or contracts with the president, managers, and company of the Schuylkill Navigation Company, and with the Reading Company, whereby the Navigation Company shall bind itself to keep and maintain its dams, slack-water pools, impounding reservoirs and basins, and so regulate the passage of boats through its canals that the

water stored in the slack-water pools, impounding reservoirs, basins, and dams shall be permitted to flow to the city of Philadelphia when and as directed by the officer of the city having charge of its water supply; and that the Reading Company shall agree to indemnify and save harmless the city of Philadelphia from all actions and liabilities whatever arising from any interruption of navigation, when by reason of any exigency it shall become necessary for the public good to regulate the flow of the water irrespective of the injury to navigation; and that the more effectively to carry out the purposes of the contract, the Navigation Company shall appoint as its assistant superintendent such person as may be from time to time nominated by the Mayor of the city, and that both the Reading Company and the Navigation Company shall agree that the city of Philadelphia shall exercise all such police powers and regulations over the works of the Navigation Company as shall be necessary to prevent the pollution of the waters, and shall further agree to permit such channels and conduits to be placed in the pools or reservoirs in the river Schuylkill as may be found convenient to convey the water gathered in times of storm to new reservoirs or to filtration beds or plants;

SEC. 2. That upon the execution and delivery of such contract or contracts and their approval by Councils, containing covenants adequate in the opinion of the Mayor and City Solicitor and Councils, to confer upon the city of Philadelphia the rights, powers, and privileges mentioned and set forth in the first section hereof; and in consideration thereof and of the covenants therein contained, the Mayor be, and he is hereby, authorized and empowered to execute and deliver such instrument of writing as shall be advised by the counsel of the parties interested to be necessary to release and relinquish to the said parties all liability to the city on account of so much of the claims which have arisen, grown out of, or may arise or grow out of the obligations of The Philadelphia and Reading Railroad Company or the Philadelphia and Reading Terminal Railroad Company, assumed by them or either of them pursuant to the provisions of the ordinance of March 17th, 1894, for the removal

of grade crossings on Pennsylvania Avenue, and of the ordinance of December 26th, 1890, as shall be agreed upon with the Mayor as a just compensation for the rights, powers, and privileges to be granted in the contract so to be entered into; and that the Mayor be, and he is hereby, also authorized and empowered to cancel, surrender, and deliver up all bonds held by the city to secure the performance of the covenants of the said parties entered into pursuant to the provisions of the said ordinances, and also to surrender and deliver all collateral securities held by or on behalf of the city to secure the performance of the said covenants or any of them.

Extracts from a Report by Edwin F. Smith, Civil and Hydraulic Engineer, upon the Utilization of the Works of the Schuylkill Navigation Company as an Adjunct to the Water Supply of the City of Philadelphia.

The city of Philadelphia obtains its supply of water for domestic and manufacturing purposes from the Schuylkill and Delaware Rivers, pumping approximately ninety-four per cent. of its supply from the Schuylkill and six per cent. from the Delaware. There are no impounding reservoirs under the control of the city upon either of these streams. The city is therefore entirely dependent upon their natural flow.

Under these conditions the true measure of the value of the Schuylkill for supplying water to the city is its capacity during a period of minimum flow, and not the average flow throughout the year, as is so often stated.

This should be the invariable rule when dependent upon the normal stream flow only. If reservoir capacity is provided, either by impounding dams in the bed of the stream or by distributing reservoirs in connection with the distribution system, the capacity of any stream will be supplemented by those means, and its capacity for water supply will then be the average daily pumpage during a period of drought plus the average daily use of the impounded water during the same period.

The total capacity of the existing reservoirs of the city is nominally about 1,400,000,000 gallons, or about six days' supply at the present rate of consumption.

As early as 1893 the city had increased its pumping capacity to such an extent that it could exhaust the river in seasons of drought, and on many days in 1895 it pumped daily a greater quantity of water than the natural flow of the river furnished.

On the 11th of October, 1867, a committee of the Commissioners of Fairmount Park, in a special report on the preservation of the purity of the water supply, said :—

" The consideration of the sufficiency of the Schuylkill as a source of supply for a considerable number of years involves,

first, the somewhat difficult problem of estimating with certainty the increase of population and the corresponding increase of water required for its use; and, *secondly*, the power of equalizing the supply of water in the river by artificial means, *so that the flood water may be made to compensate for the diminished flow in the dryest of the Summer months.*"

At the time that the above was written the population of the city was approximately 650,000, and the average daily pumpage during midsummer from the Schuylkill was approximately 40,000,000 gallons, or 60 gallons *per capita*. In 1896 the population was about 1,300,000, the average daily pumpage was 221,651,036 gallons, the average of the month of maximum consumption was 241,741,561 gallons, and the consumption *per capita* 172 gallons.

The abnormal droughts since the year 1869 during which the stream flow at Fairmount has been below 250,000,000 gallons per twenty-four hours have been as follows:—

Year.	Minimum flow of the Schuylkill River at Fairmount.
1874	245,000,000 gallons per 24 hours.
1878	220,000,000 " "
1879	223,000,000 " "
1880	200,000,000 " "
1881	167,000,000 " "
1885	230,000,000 " "
1892	219,000,000 " "
1895	185,000,000 " "
1896	194,000,000 " "

The maximum pumpage generally occurs during the midsummer season, and it is frequently coincident with a period of drought. In 1896 it occurred in the fourth week of the month of August, and was approximately as follows: Fairmount Station, no pumpage; river too low to use water power; Spring Garden Station, 170,000,000 gallons per day; Belmont Station, 29,500,000 gallons per day; Queen Lane Station, 36,000,000 gallons per day; Roxborough Station, 20,000,000 gallons per day. Total, 255,500,000 gallons per day.

It is safe to say, therefore, that the demand upon the Schuylkill may reach 250,000,000 gallons per twenty-four hours at

any time during the midsummer months, and that this may occur during a period when the river is at its minimum stage, and that in consequence the whole flow of the river may be pumped, as indeed has frequently been done at the four stations operated by steam.

There have been nine years out of the twenty-three years commencing with 1874 in which pumpage from the Schuylkill at the above rate, 250,000,000 gallons daily, would have exceeded the available flow of the river.

It has been asserted in Council Chambers and in the newspaper press that the works of the Schuylkill Navigation are of no value to the city as an adjunct to its water supply, and that the city now has all the rights and privileges in the river Schuylkill needful for the successful operation of its system of water works on that river.

These assertions cannot be sustained by the facts known to exist.

Particularly is this the case in the operation of the three pumping stations on Fairmount Pool—Spring Garden, Belmont, and Queen Lane.

If the city of Philadelphia were to-day restricted to the provisions of its agreements with the Schuylkill Navigation Company, dated June 3d, 1819, July 20th, 1820, and June 14th, 1824, it would be able only to operate its steam machinery intermittently at times, and particularly during low-water seasons its operations would be crippled.

The Schuylkill Navigation Company has for twenty-three years past allowed the city privileges in Fairmount Pool which no individual or private corporation would grant without compensation.

At the present rate of consumption of water the inability to properly supply the pumps on Fairmount and Flat Rock Pools from the natural flow of the river alone, will be felt with every recurring drought. Only recently, on the eleventh of October, 1896, we were obliged to draw upon the storage water of the upper pools to replenish the lack in Fairmount Pool.

As early as 1869 the city found it necessary to use its police power to close the locks of the Navigation at Fairmount,

and to ask for the storage water in the up-river dams to avert a water famine.

Again, two years ago (1895) the calamity of empty reservoirs and restricted use of water was averted only by the timely aid given by the Navigation Company. It was at a time of extreme drought, when the water works could no longer be operated to the required capacity from the normal flow of the river. The city drew the water in the pool down to such a stage that not only was navigation interfered with, but the operation of the pumping stations was crippled as well. In this emergency use was made of the impounded water in the up-river dams of the Schuylkill Navigation, as will best be shown by the following table :—

Date—1895.	Fairmount Pool drawn down by city below normal stage.	Feed water let down from pools of the navigation on the upper river to raise Fairmount Pool. Gallons.	Height above normal stage when feeding ended.
July 13th	3 inches	44,000,000	3 inches.
" 16th	3 "	30,000,000	2 "
" 31st	1½ "	7,500,000	1 "
August 2d	4 "	44,000,000	2 "
" 11th	1 "	45,000,000	2½ "
" 19th	5 "	22,000,000	0 "
" 22d	9½ "	82,000,000	0 "
" 26th	16 "	67,000,000	2 "
September 8th	7 "	15,000,000	2 "
" 11th	1 "	15,000,000	3 "
" 16th	13½ "	104,000,000	½ "
" 22d	17½ "	67,000,000	5 "
" 30th	14½ "	96,000,000	5½ "
October 7th	21 "	140,000,000	6 "
" 28th	3 "	15,000,000	1 "
" 29th	1 "	7,500,000	1½ "
" 31st	3½ "	30,000,000	2 "
November 5th	2 "	7,500,000	5 "
Totals—117 days	127 inches	838,500,000	. . . . .

The benefit to the city of Philadelphia by feeding from the dams on the upper river, in eighteen successive feeds or flushes, a quantity of water as great as 838,000,000 gallons, equal to the entire reservoir capacity of the city at that time, must be apparent to any one acquainted with the necessities of the city during that Summer.

Another reason why the normal flow of the river should be supplemented from the storage of the upper river during the Summer season, is the fact that for years past Fairmount Pool has been operated as a lake or basin, no water being allowed to flow over the dam for long periods at a time. This has occurred to a greater or less extent during the low-water season of every year since 1875, the least number of days in any one year being ninety-one and the greatest three hundred and four, and is the means of making the river in tidewater below Fairmount Dam very foul. It is also suggestive of draining Fairmount Pool at times to the dregs, a method of operation that is hurtful to the purity of the water pumped.

These, then, are the conditions under which the city is supplied with water from the Schuylkill at the present time, and it is improbable that there will be any change in the near future, because the work necessary to effect it would require years. Moreover, the city has recently built, at a large cost, the Queen Lane division of the water supply from the Schuylkill, embracing an expensive reservoir of a capacity of 383,000,000 gallons, and has built a pumping station on the river near the mouth of Wissahickon Creek with a capacity of 80,000,000 gallons per day, which extension is predicated upon a still larger use of the river.

The question, therefore, naturally suggests itself, by what means shall the Schuylkill be made to the largest extent available for the successful operation of the existing pumps and reservoirs?

Believing that the works of the Schuylkill Navigation have a certain value to the city as an adjunct to the present water supply, I desire to submit herewith my reasons therefor, and to suggest the proper method of utilizing them.

First.—The Advantage of the Use of the Up-River Pools.

The Schuylkill Navigation is a slack-water navigation, made up of pools created by dams in the river. In the first thirty miles from tidewater the pools are nearly continuous, being broken only by four short connecting canals. In the second thirty miles the fall of the river is more rapid, and

canals predominate. In the third thirty miles, making the total distance to the Blue Mountains ninety miles, the navigation is about equally divided between slack-water pools and canals.

The pools can be made of great use to the city by a very moderate outlay of money for their adaptation to the needs of the Water Department.

They are sixteen in number, exclusive of Fairmount Pool, which is already partly in the control of the city, and they cover forty-three miles of the total distance (eighty-four miles) from Flat Rock Dam to the Blue Mountains.

Their characteristics are best shown by the following table:—

POOLS OF THE SCHUYLKILL NAVIGATION.

No. of pool.	Local name.	Length in miles.	Average width in feet.	Surface area in acres.	Depth to draw down in feet.	TOTAL STORAGE CAPACITY.	
						Cubic feet.	Gallons.
31	Flat Rock Pool .	4.45	510	275.1	1.5	29,927,250	223,855,800
30	Plymouth " .	3.47	549	212.0	1.0	9,273,000	69,362,000
		1.0					
29	Norristown " .	3.40	753	309.6	2.5	47,031,802	351,798,000
28	Catfish " .	3.88	457	215.1	6.0	64,144,500	479,801,000
		.8					
27	Pawling's " .	1.79	428	118.2	5.0	29,714,731	222,266,200
. .	Oaks Canal " .	.47	148	31.0	5.5	7,219,950	54,005,300
		.20					
26	Black Rock " .	3.89	417	189.5	9.0	68,687,438	513,782,100
		.36					
25	Vincent " .	2.23	477	118.6	8.0	41,644,647	311,502,000
24	Lewis' " .	2.50	328	108.9	10.0	49,479 418	370,106,100
23	Poplar Neck " .	2.47	354	103.5	8.0	35,282,624	263,914,000
22	Kissinger's " .	1.49	267	48.2	10.0	22,598,470	169,036,600
21	Shepp's " .	1.16	265	35.3	9.0	14,552,855	108,855,400
20	Leize's " .	1.83	375	80.6	9.0	31,555,265	236,033,400
19	Felix's " .	3.47	273	116.3	10.0	60,061.538	449,260,300
. .	Duncan Canal " .	2.66	60	19.4	5.0	3,511,250	26,264,200
18	Herbine's " .	.97	224	23.9	6.0	6,380,812	47,728,500
		.28					
17	Little Blue Mt. " .	.72	259	26.7	6.0	9.630,925	72,039,200
16	Big Blue Mt. " .	2.01	287	72.5	8.0	31,866,450	238,361,000
	Totals	45.5	. . .	2104.4	. . .	562,562,925	4,207,971,100

The total storage capacity on the river is, as per statement, in round numbers 4,208,000,000 gallons, a quantity somewhat more than *three times as great* as the combined capacity of all the reservoirs in the city—Fairmount, Spring Garden, Corinthian, East Park, Belmont, Roxborough, Queen Lane, Fairhill, and Wentz Farm.

Distributed over ninety days, the average period of low water, this storage would permit the feeding into Fairmount Pool of nearly 50,000,000 gallons every twenty-four hours. It has never yet occurred, and probably never will, that a uniform quantity per day must be let down, as local showers in the valley materially assist in keeping up the supply. It is therefore more reasonable to estimate that the total quantity in storage would in the dryest years be distributed over a period of sixty days, and be fed into Flat-Rock and Fairmount Pools at an average rate of 70,000,000 gallons per twenty-four hours, which would raise the surface of Fairmount Pool *six inches* higher than the elevation due to the normal flow of the river.

The cost to the city of that part of the works of the Schuylkill Navigation which it is proposed to utilize is very much less than the first cost of the nine city reservoirs.

The works at the present time are in good order, having been maintained so during the lease to the Philadelphia and Reading Railroad Company.

There are periods of long duration when there is an insufficient flow in the river to supply the pumping stations. This is of almost yearly occurrence. At these constantly-recurring intervals the storage in the pools of the Schuylkill Navigation would be of great value to the city of Philadelphia.

Second.—The Pool of Flat Rock Dam.

The city has enjoyed the privilege of pumping from Flat Rock Pool since the year 1868, and of using a portion of the Navigation Company's right of way for its intake and wharf at Roxborough Pumping Station without compensation.

Since under the agreement of June 3d, 1819, the city possesses the whole of the water power of Fairmount Dam

except so much water as may be necessary to operate the Navigation, the legality of which has never, I believe, been questioned, it could in the same manner control the whole of the water power at Flat Rock, and could regulate the flash boards to suit the supply of water to its pumping stations in Fairmount Pool and utilize the surplus for power.

Third.—The Pool of Fairmount Dam.

It would be of great advantage to the Bureau of Water to have the full control of Fairmount Pool, with the right to fix and maintain such an elevation of its surface by means of "flash boards" on the dam as may best suit the operation of its pumping stations.

Flat Rock and Fairmount Pools in Connection with Filtration.

I wish to call attention to the availability of sites at Flat Rock and in Fairmount Pool, which are of sufficient area to install gravity sand filters similar to those in use at London and many European cities, and at Lawrence, Mass., and a few other cities in this country, as I believe that sand filtration is the proper system for Philadelphia.

Mechanical filtration under pressure, which is all right for the clarification of water for manufacturing purposes, would not in my opinion stand the test if used *on a large scale for water for domestic purposes.*

At the head of the canal at Flat Rock, immediately below the site of the proposed new dam, there is what is called the "Wide Water." This area can be separated from the canal, and in connection with adjoining private property can be raised to a sufficient height above the level of the canal to permit of the building of sand filter beds of an area of twenty acres, with a filtering capacity at the normal rate of working of 40,000,000 gallons per twenty-four hours.

This would seem to be ample provision for Roxborough Pumping Station, especially after certain changes in the distribution system are made, which I understand are contemplated.

In operating the filter beds the raw water from Flat Rock Dam would be raised by pumps to the receiving basins, thence distributed over the beds, and the filtered water carried in a steel pipe conduit, by gravity, a distance of three thousand feet to the pumping station.

In Fairmount Pool two good sites for sand filter beds for the West Philadelphia supply exist on ground now occupied by the Schuylkill Navigation, immediately adjoining Belmont Pumping Station, and extending along the shore of the river north and south of the same.

The first can be created by filling up what is known as the "Mud Canal," an inside channel of the Schuylkill Navigation, between Lansdowne Island and the west shore, and raising that area and the island to a height of fifteen feet above the level of Fairmount Pool. By so doing, a tract of land measuring nine acres may be made available.

The second, extending along the west shore above Columbia Bridge, raised to the same elevation, would contain an area of seven acres of filter beds.

One of the advantages of these sites on the river is the cheapness of the operation of the filter beds as compared with any locations adjoining the distributing reservoirs. Sand and other material for renewals can be brought alongside in boats, and steam for operating the centrifugal pumps can be piped from the existing pumping stations, or they can be better operated by electric motors. At Flat Rock the pumps could be driven either by water power or by electricity generated by the water power.

I believe it would be found practicable also to raise the waste low land in the Park south of Wissahickon Creek, between Ridge Avenue and the river adjoining Queen Lane Pumping Station, containing about ten acres, and the land north of the creek, now occupied by a Summer garden, and adapt these locations for a filtration plant in connection with Queen Lane Station. It would require changes in Park drives and in roads connecting with City Avenue Bridge, but these matters are not beyond the reach of good engineering. The water supply would flow by gravity through a steel pipe

line from Flat Rock Dam, avoiding the pollution of the river from Manayunk on the east side, and Rock Hill Creek and Pencoyd on the west side.

To this site also the materials for maintenance and renewals could be brought by boat, and the effluent from washing the filter beds could be drained into the intercepting sewer.

There remains the Spring Garden Pumping Station on the Schuylkill to be considered, and I know of no better location for filter beds for this supply than the one suggested by Mr. Hazen on the tract originally designed for the Cambria reservoir.

Utilizing all these locations, we would have approximately the following capacities :—

	Acres available.	Maximum capacity, 2,500,000 gallons per acre per 24 hours.
		Gallons.
Roxboro—approximately	20	50,000,000
Queen Lane "	12	30,000,000
Belmont "	16	40,000,000
Spring Garden "	30	75,000,000
	78	195,000,000

This is certainly very nearly the maximum capacity of the Schuylkill River as a permanent water supply. Anything in excess of 200,000,000 gallons per twenty-four hours should come from the Delaware River.

I believe the proper solution of the water question to be a redistricting of the city and a better division of the supply between the Delaware and Schuylkill Rivers, with sand filtration for both sources and provision for metering the supply to all consumers. No city can afford to filter its water supply and serve it to consumers to be wasted.

The system here proposed, including filtration for Belmont and Roxborough Pumping Stations, could be put in operation in connection with the present water works within a period of about fifteen months.

SEPTEMBER 15TH, 1897.

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